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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/591,686

09/05/2006

Ronald Kumst

LEO 004 PA

1489

29673 7590 05/15/2008
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EXAMINER

GISSEL, GUNNAR J

ART UNIT

PAPER NUMBER

2856

MAIL DATE

DELIVERY MODE

05/15/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/591,686	Applicant(s) KUMST, RONALD	
	Examiner Gunnar J. Gissel	Art Unit 2856	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-4,6,8-12 and 14-17 is/are rejected.
- 7) ☐ Claim(s) 5,7 and 13 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 05 September 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____. |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>3/17/2008</u> . | 6) <input type="checkbox"/> Other: ____. |

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-4, 6, 8-12, 14-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent 5,837,935 to Judd Carper et al. (Carper) with teachings from US Patent 6,436,853 to Liwei Lin et al. (Lin).

Regarding Claims 1, 6, 8-12 and 14, Carper discloses, 1. (Currently Amended) A process for evaluating the hermeticity of a wafer connection, the process comprising manufacturing a test structure by forming a micromechanical sensor structure (MEMS structure 34) and first contacting islands which are connected with the micromechanical sensor structure (contacting islands 36), and creating a cavity by connecting the cover a cover wafer with the base wafer so that the micromechanical sensor structure and the melt structure are located in the cavity (cavity 20); whereby a change in pressure is generated in the interior of the cavity, which change has a chronological course which is measured by means of the micromechanical sensor structure (MEMS structure 34; the MEMS structure senses whether the seal remains hermetic, which inherently includes a chronological course of change).

Carper does not explicitly disclose an adjacent melt structure or second contacting islands which are connected with the melt structure on a base wafer or

impressing a current into the second contacting island in order to cause the melt structure to melt for the purpose of the hermeticity test of the cavity.

Lin discloses an adjacent melt structure or second contacting islands (figure 11a, interconnection) which are connected with the melt structure on a base wafer (figure 11a, microheater is connected to the interconnection on the base wafer) or impressing a current into the second contacting island in order to cause the melt structure to melt for the purpose of the hermeticity test of the cavity, the melt structure comprises a rated melting, the melt structure is composed of metal, the metal contains aluminum (Lin, column 7, lines 32-45) , and in the case of a current flow, melting parts of the melt extend in a meander like fashion in the cavity (Lin, column 7, lines 32-45). As no containing or forcing structure is present to channel the molten metal, the metal will inherently meander when it is melted

It would have been obvious to one of ordinary skill in the art at the time of the invention to combine Carper with teachings from Lin because Lin teaches a method of hermetically bonding a MEMS system together while maintaining a relatively low heat in bodies adjacent to the heaters (Lin, column 5, lines 46-50). Using Lin's method of bonding, coupled with a sensor that senses ambient pressure over time would reveal whether the increase in pressure, from the melted and vaporized aluminum solder, would be consistent with a hermetic seal. The combination of Carper with Lin's teachings does not result in anything unexpected, because Carper's device still achieves a hermetic seal, Lin still achieves a hermetic seal, and soldering a cap wafer over a base wafer does not render a pressure sensitive MEMS inoperable, and the

melting of the aluminum will cause a rise in the internal pressure of the cavity, which will register on the MEMS.

Regarding Claim 2, Carper also discloses manufacturing several microelectromechanical structures on the wafer connection (MEMS structures 34).

Regarding Claim 3, Carper also discloses several test structures are produced at specific points of the wafer connection (MEMS structures 34, figure 1).

Regarding Claims 4 and 16, Carper also discloses that the several test structures are disposed in accordance with predetermined criteria of quality monitoring for the microelectromechanical structures (MEMS structure 34). The MEMS structure is designed into a specifically placed cavity to determine the integrity of the hermetic seal, it is not randomly or accidentally placed, and it is designed into a particular place before construction of the device begins, therefore the test structures are disposed in accordance with a predetermined criteria, as all designed things are.

Regarding claim 15, Carper also discloses several test structures and several microelectromechanical structures are provided (MEMS structures 34).

Regarding Claim 17, Carper also discloses the test structure and the microelectromechanical structure are disposed as a bond (bond 36).

Allowable Subject Matter

3. Claims 5, 7 and 13 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. US Patent Application Publication 2003/0073292 concerns the use of pressure sensitive MEMS to determine hermiticity. US Patent 6,297,072 concerns internal heaters melting aluminum. US Patent 6,106,735 concerns hermetically sealing MEMS between wafers.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gunnar J. Gissel whose telephone number is (571)270-3411. The examiner can normally be reached on Mon-Fri, 7:30AM-5:00PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hezron Williams can be reached on (571)272-2208. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/GJG/

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/Hezron Williams/
Supervisory Patent Examiner, Art Unit 2856